Lining for the Combustion Chamber of a Heating Device, Particularly Vehicle Heating Device

Cross-References to Related Applications

[0001] Not applicable.

Statement Regarding Federally Sponsored Research or Development

[0002] Not applicable.

Background of the Invention

Technical Field

[0003] The present invention relates to a lining for the combustion chamber of a heating device, particularly a vehicle heating device.

[0004] In heating devices such as are used in motor vehicles as auxiliary heaters or supplementary heaters, it is known for so-called evaporative burners to feed the liquid fuel into a lining provided on the inner wall of a combustion chamber, in order to distribute and forward the fuel in this material by capillary action and to evaporate it from the surface of the material into the combustion chamber. According to the mounting position of a heating device in a vehicle, and however also taking account of the direction of gravity, a given flow tendency thus results in the lining, with the consequence that generally evaporation is non-uniformly produced over the surface of this lining, with correspondingly non-uniform combustion, which can lead to considerable combustion residues and a reduced service life.

Summary of the Invention

[0005] The present invention has as its object to provide a lining for the combustion chamber of a heating device, particularly a vehicle heating device, by means of which an improved distribution of the fuel being fed into a combustion chamber can be obtained.

[0006] According to the invention, this object is attained by a lining for the combustion chamber of a heating device, particularly a vehicle heating device, wherein the lining comprises at least one lining member formed for fuel forwarding by capillary action, with at least one fuel receiving region, and a fuel flow guiding arrangement is provided in the at least one lining member for influencing the flow direction of the fuel.

[0007] By influencing the flow direction of the fuel forwarded by capillary action in the lining, it becomes possible to conduct this fuel specifically into given regions of the lining, so that, for example, as uniform as possible a distribution of the fuel over the surface of the lining can be obtained, or regions in which the ignition is to start are more heavily supplied with fuel.

[0008] In order to be able to obtain this defined influencing of the flow direction of the fuel, it is proposed that the fuel flow guiding arrangement includes at least one region of increased flow resistance. For this purpose it is for example possible that at least one region is formed by compressing the constructional material of the at least one lining member. Alternatively or additionally, it can also be provided that the at least one region is formed by providing a recess in the at least one lining member, and the recess can preferably be formed here as a groove.

[0009] It is furthermore possible, in the lining according to the invention, that the at least one region at least regionally surrounds the fuel feed region.

[0010] The at least one lining member of the lining according to the invention can be constructed of porous material for obtaining the distribution of the fuel by capillary action. Here, for example, felt, braided, nonwoven, or spun yarn material may be used, and on the one hand can provide the required porosity in a simple and cost-effective manner, and on the other hand can easily be adapted to the shape of a combustion chamber. Other materials, such as

for example foamed ceramic or the like which can provide for capillary action, can of course be used.

Brief Description of the Drawings

[0011] The present invention is described in detail hereinafter with reference to the accompanying drawings.

[0012] Fig. 1 shows a lining element embodied according to the invention, in axial view;

[0013] Fig. 2 shows the lining element of Fig. 1 in a perspective view;

[0014] Fig. 3 shows a view corresponding to Fig. 2 of a lining element in another mounting situation;

[0015] Fig. 4 shows a plan view of the lining element shown in Fig. 3;

[0016] Fig. 5 shows an alternative lining element according to the invention;

[0017] Fig. 6 shows the lining element of Fig. 5 in a developed view;

[0018] Fig. 7 shows the lining element shown in Fig. 5 in another mounting situation;

[0019] Fig. 8 shows a developed view of the lining element shown in Fig. 7.

Detailed Description of the Invention

[0020] In Figs. 1 and 2, a lining element 10 is shown which can be provided on the floor region of a combustion chamber, shaped like a pot, of a so-called evaporative burner for a vehicle heating device. In the central region, a fuel feed region is provided, defined for example by an aperture 12, and the fuel can be taken up therein from a fuel feed duct opening into the floor region of the combustion chamber. The lining element 10, formed as a circular disk, is constructed of porous material, for example of nonwoven material, spun yarn material, woven material, braided material, material of net-like construction, or else of solid material such as, e.g., foamed ceramic or the like. The fuel entering the lining element 10 in the fuel

feed region 12 is forwarded in this by capillary action, so that with corresponding fuel feed substantially the whole lining element 10 is saturated with fuel. The fuel then evaporates from the surface of the lining element 20, also conditioned by the comparatively high temperatures in the combustion chamber, and enters the combustion chamber for combustion with the combustion air.

[0021] In the mounting position shown in Figs. 1 and 2, substantially orthogonal to the direction of gravity S, of such a lining element 10, or a corresponding mounting position of the combustion chamber (F denotes the flame direction in operation), a barrier 14 like a ring segment is provided in order to ensure that the fuel entering the lining element 10 does not collect in the lower region of the lining element 10 due to gravity. This barrier 14 surrounds the fuel supply region 12 and is interrupted in an upper region in this mounting situation. The barrier 14 can for example be formed by compressing the porous material of the lining segment 10; by arranging a recess, for example a groove-like recess or one passing completely through, the surfaces of which can if necessary also be sealed; or for example also by local application of material closing the pores, for example synthetic resin material or the like. The fuel can thus flow out only in the open region 16 over the barrier 14 and is thus also distributed in the region situated outside this barrier 14. In this manner, a very uniform distribution of the fuel over the whole lining element 10 to be provided at the floor region of a combustion chamber can be obtained, wherein by means of the orientation of the barrier 14, by the shape conferred on the barrier, and by the arrangement of the same, an influence can of course be exerted on the flow direction or on those regions into which fuel can be preferably deflected, for example because an ignition member is provided there.

[0022] In Figs. 3 and 4, the same lining element 10 is now shown in a vertical mounting position, i.e., a lining position in which the flame direction, which can also be seen in Fig. 3, is parallel to the direction of gravity S and not oriented perpendicularly thereto. Since with such an orientation gravity will have substantially no action on the distribution of fuel in the lining element 10, an effect can nevertheless be exerted by such a barrier 14 in order, for example, again to provide that the fuel preferably flows into that region in which an ignition member, for example a glow ignition pin, is present. As in Fig. 1, in Fig. 4 the region preferably supplied with fuel is emphasized by shading.

[0023] In Figs. 5 and 6, a lining element 18 is shown which has a rectangular shape in the developed view of Fig. 6, but which is however rolled up into a cylindrical ring in its mounting position and can thus be used as the lining of the pot wall of a combustion chamber. A fuel supply region 20 is present here also, through which the liquid fuel can reach the porous material of the lining element 18.

[0024] The barrier 22 acting to guide the fuel here is elongate in the length direction of the lining element 18 in the developed view, and thus forms, in the mounting situation which can be seen in Fig. 5, a region like a ring segment extending along the peripheral direction and in its turn open in the peripheral region 24. In this peripheral region 24, the fuel can then also flow into the other axial region of the lining element 18.

[0025] In the mounting situation which can be seen in Figs. 7 and 8, in which the flame direction F again runs parallel to the direction of gravity S, the barrier 22 is arranged under the fuel supply region 20, so that it is now ensured that the fuel has to flow in the peripheral direction along the barrier before it can then further flow axially downward in the open peripheral region 24.

[0026] It goes without saying that such barriers formed by impressions, recesses, or the like can be formed or positioned other than as shown in the Figures, and adapted to the flow guidance to be provided and to the mounting situation of such a lining element. Thus an annular barrier could also be interrupted in order to make the passage of fuel possible at plural peripheral regions. It is of course also possible that a barrier is constructed such that it nevertheless permits a certain fuel leakage through the barrier. By the provision of such a barrier acting to distribute the fuel, it is ensured that, depending on the accompanying more uniform fuel distribution, the combustion proceeding in a combustion chamber can proceed with less pollutant formation and less pollutant deposition in the combustion chamber. Furthermore, by corresponding embodiment of the barrier, it can be ensured that the distribution of the fuel in the porous material for evaporation is less impaired by the mounting position of a heating device in a vehicle.